Art. XXII.—*Patent for "Improvements in Contrivances for Varying the Gauge of the Wheels of Rolling Stock for Rail and other Permanent Ways."*

By D. Anderson.

[Read 16th November, 1882.]

The nature and working of my invention may be described in these terms, viz.:—

The axle is made with a solid collar in the centre. On each side of this collar is a sleeve, to the outer end of which the wheel is fastened, and these sleeves are drawn out *from* or *in to* the solid collar by right and left-handed screws fastened to a double platform, on which the wheels rest in recesses shaped to their bottoms. On the inner end of each sleeve is a flange, which is held by a hinged clamp on each side of the solid collar. In these hinged clamps are recesses for the reception of the flanges when the clamps are closed. The hinged clamps are opened and allowed to fall back by the partial unscrewing of two nuts, working on two hinged bolts, thus enabling the sleeves with their flanges to slide along the solid axle, either away *from* or *to* the solid collar, according to whether the wheels are to be adjusted to run on a broad or a narrow gauge.

A truck with its load by this method, and with the aid of machinery to work the right and left-handed screws, can, without unloading, be made to run on either a broad or a narrow gauge in a few minutes. When the clamps are closed the nuts are screwed home, and a split key or pin is inserted through the bolt, thus rendering it impossible that they can get loose or shift in the slightest degree. If preferred, Ibbotson's safety nuts can be used without the split pin.

By my patent the inconveniences and delays in transmitting goods over country laid down with lines of different gauges can be reduced to a minimum. Should the Governments of Victoria and New South Wales adopt my plan, goods can be carried from Melbourne to Sydney as quickly

as if the two lines were of the same gauge, allowing for a detention of, say, one hour at the break of gauge if one truck at a time is altered by my platform, or half an hour only, if each truck be provided with a platform.

If machinery be used to work the right and left-handed screws, I estimate that a truck can be altered from the broad to the narrow gauge, or *vice versa*, in five minutes. If a platform be provided for each truck, any number can be altered, after the hinged clamps are opened and thrown back, in the same time as one, by the aid of an engine in the pit working an endless cogged chain which would turn all the right and left-handed screws simultaneously.

Between Victoria and New South Wales I propose using an axle of 5 inches diameter, and as my sleeves are $1\frac{1}{4}$ inches in general thickness, I add to the strength instead of diminishing it. The first axles made according to my patent will be more expensive than those now used, because the sleeves and hinged clamps are difficult to make; but as they are practically indestructible, it will only be the first lot that will be expensive. As the sleeves are prevented by the feathers from revolving on the axles, there will be no friction, and when the journals of the solid axles are worn out the same sleeves and hinged clamps can be used for the new solid axles required. The forging of the solid collar on the axle will be troublesome, but I think it better to do this than risk any failure. At the same time, I consider that were the centre of the axle recessed a little all round, a collar in two parts, fastened together by strong riveted bolts, would answer the purpose equally well, and would, of course, be less expensive. This, however, is for the consideration of the Governments who adopt the patent. In bringing dead meat from the interior of New South Wales to Melbourne my invention gets over the present difficulty of break of gauge, for it can be placed in refrigerating cars and sent to Melbourne without re-handling, thus avoiding all risk of thawing by being exposed to the warm air, as must follow if the contents of the cars are transferred from New South Wales' to Victorian trucks. Again, in bringing coal from New South Wales to Victoria, all the trouble, expense, and loss of time in unloading would be avoided. Provided that an axle according to my patent is made wide enough to run on the broader gauge, all that is necessary to enable trucks to run on a narrower line is to shorten the sleeves and make the hinged clamps wide enough

to carry recesses to keep the flanges in position. As there is a difference of 6½ inches between the gauges of the Victorian and New South Wales lines, I make my solid axle 5 inches in diameter, being half an inch thicker than the present Victorian axles, in order to allow for the overhang. Between New South Wales and Queensland, the difference of gauge being 14½ inches, I propose making the solid axle 5½ inches thick. For South Australia and Tasmania, where the gauges are 5 feet 3 inches and 3 feet 6 inches, the difference being 21 inches, I propose making the solid axle 6 inches. The sleeves and hinged clamps, however, will be of the same thickness in every case. It is reasonable to suppose, however, that if the axles are made of the very best steel procurable, these dimensions may with safety be lessened, and the cost, as a consequence, diminished. Experience only will prove this, and the various Governments must decide upon these points after trial. My invention can be applied to passenger cars as well as goods trucks; but as persons can walk from one train to another in a few minutes, there is no absolute necessity for it. Each passenger train may, however, be provided with luggage trucks placed upon my axles, and these can be altered to the broad or narrow gauge as required. The alteration of brake fastenings and blocks can be effected in a variety of ways, and I show a simple and inexpensive one on my model.

Letters patent have been granted to me for Victoria, New South Wales, New Zealand, and the United States, while they have been applied for in the other colonies, Great Britain, Canada, India, and most of the European States. Plans were sent to England on 5th September last for the manufacture of two sets of axles and wheels, which ought to arrive in Victoria in the latter end of March next, when I hope to get permission from the Governments of Victoria and New South Wales to run a truck, provided with my axles, from Melbourne to Sydney and back again. No alteration of truck will be required, as my axles can be placed under any of the Victorian ones now in use.

SPECIFICATION

OF

David Anderson, of Fairview, Stawell, in the Colony of Victoria, Gentleman, for an invention entitled

"Improvements in Contrivances for Varying the Gauge of the Wheels of Rolling Stock for Rail and other Permanent Ways."

My invention consists mainly of certain improvements in railway and other rolling stock, by which the gauge of the wheels may be adjusted; and, secondly, of machinery whereby such alteration or adjustment of gauge is effected.

The first part of my invention consists of a peculiar construction of the axles of rolling stock for rail and other permanent ways in which either wheel is keyed to a sleeve, the inner end of which terminates in a flange. This sleeve slides over and upon the axle and the feathers thereon. The axle I make with a solid collar in the centre, and on either side of such collar I place a clamp or hinged collar having two or more recesses or hollows to fit over the flange of the sleeve and a strong hinged bolt to tighten said clamp thereon. I bolt both clamps or hinged collars together through the solid collar of the axle.

The second part of my invention consists of a certain combination and arrangement of machinery in which a sole plate carries the bearings for two sets of rollers. Each set consists of two rollers upon which travels a platform, the upper side of which is recessed to the shape of the tire of a wheel, or carries a rail. The underside carries a nut (right or left handed as the case may be) in which one end of a right and left handed screw works. This screw has a thrust bearing in the centre of the sole plate, and is provided with a collar having sockets for a crowbar or other means of turning it.

In order, however, that my invention may be more perfectly understood, I will now describe the same with reference to the accompanying drawings, in which Fig. 1 shows a side elevation, partly in section, of a pair of wheels, provided with my improved axles, resting in the recesses upon the platforms of my improved machinery as they would be just previous to narrowing their gauge. Fig. 2 is an end elevation of the same. Fig. 3 a plan of the machinery alone, and Figs. 4 and 5 detail views of the hinged clamps.

AA are the wheels which may be of any description so long as their bosses A1 are large enough. B is the axle with solid collar B1 in the centre. B2 are steel feathers properly secured to said axle. C are the sleeves terminating in flanges C1. DD are the clamps or hinged collars having two recesses D1 and D2 in each. D3 are the hinged bolts having plate washer D4. D5 are the bolts through the clamps and the solid collar of the axle and having connecting plates D6 at either end. E is the sole plate of my improved machinery firmly bolted to a solid foundation, and E1 and E2 are the two sets of rollers thereon. F are the platforms carrying recesses F1 and nuts F2. G is a right and left handed screw with turning collar G1 and thrust bearing G2.

The mode of operation is as follows:—When it is desired to use the rolling stock of a rail or other permanent way upon another way of different gauge, my improved machinery is placed where the break of gauge occurs. To transfer the rolling stock, the rails or recesses F1 on the platforms F of such machinery are set by means of the screw G to the gauge of the line on which the stock is. A vehicle provided with my improved axles is then pushed upon such platforms, the clamp bolts D3 of such axles unscrewed so as to admit of the clamps being opened on their hinges D5, so freeing the flanges C1 of the sleeves C, to which the wheels A are keyed. The rails or recesses on the platforms are next adjusted by means of the right and left-handed screw G to the gauge of the line upon which it is desired to run the vehicle. The flanges C1 of the sleeves C on the axles should now fit in another recess D2 in the clamps, which are closed and tightened up as shown in Fig 4, and the vehicle then moved on to the second line.

In the drawings illustrating this invention the vehicle is shown at its widest gauge and with only one vacant recess

in each of the clamps on the centre of the axle, thus admitting of its alteration to one other gauge only, but of course the number of these recesses might be increased and the length of the sleeve altered so as to admit of its adjustment to as many gauges as may be required.

Having thus described the nature of my invention and the manner of performing same, I would have it understood that

WHAT I CLAIM AS MY INVENTION IS:—

First, constructing axles of railway rolling stock with an extensible sleeve or sleeves to admit of the alteration of the gauge of their wheels.

Second, constructing such axles with a solid collar in the centre and with a hinged clamp on either side having recesses for receiving and holding the flanges on the inner ends of the axle sleeves substantially as herein described and explained.

Third, The combination of the sole plate E, the rollers E2, platforms F having recesses F1 (or their equivalent in the shape of rails) with a right and left handed screw G, turning collar G2 and thrust bearing G3, in the manner and for the purpose herein described and explained.

D. ANDERSON.